



Oregon

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Mr. Robert J. Wyatt
Northwest Natural Gas Company
220 N.W. Second Avenue
Portland, OR 97209

**Re: Draft Cyanide Surface Water Field Sampling Plan
Northwest Natural Gas Company Site
Portland, Oregon
ECSI #84**

Dear Mr. Wyatt:

The Oregon Department of Environmental Quality (DEQ) has reviewed the "Draft Field Sampling Plan, Cyanide Surface Water Investigation, Gasco Groundwater Source Evaluation" dated July 2007 (Surface Water FSP). Anchor Environmental, LLC (Anchor) prepared the Draft FSP on behalf of the Northwest Natural Gas Company (NWNG). The Surface Water FSP provides the scope of work and sampling and analytical plan for assessing the concentrations of cyanide (i.e., total, amenable, and free forms) in the Willamette River offshore from the property owned by NWNG (NWNG Property).

The Surface Water FSP supplements the Offshore Field Sampling Approach^{1,2} project (Offshore FSA) that NWNG is conducting to investigate manufactured gas plant (MGP) waste contamination and upland groundwater plumes in and beneath the Willamette River. The Offshore FSA is being done to support the Portland Harbor in-water remedial investigation and feasibility study (RI/FS) being performed by the Lower Willamette Group (LWG).

The overall objectives of the Offshore FSA are to collect groundwater, transition zone water (TZW), and sediment chemistry data, and subsurface geotechnical information along the shoreline and offshore of the NWNG Property and property owned by the Siltronic Corporation (Siltronic). The primary objectives of the Surface Water FSP according to NWNG are to evaluate: 1) transport of cyanide in groundwater and TZW into surface water; and 2) conversion of total and/or amenable cyanide into the free form under river conditions operating during the

¹ Anchor Environmental, LLC, 2006, "Final Phase 1 Field Sampling Approach, GASCO Siltronic Groundwater Source Evaluation", September, a work plan prepared on behalf of the Northwest Natural Gas Company.

² Anchor Environmental, LLC, 2007, "Phase 1 Report and Phase 2 Field Sampling Approach, GASCO Siltronic Groundwater Source Evaluation", May, a report and work plan prepared on behalf of the Northwest Natural Gas Company.

sampling period. The Surface Water FSP is also intended to provide data for assessing potential risks to receptors in the river associated with exposure to cyanide.

DEQ's comments to the Surface Water FSP are provided below and are intended to clarify our understanding and expectations regarding the scope of work, and provide feedback on the details of the sampling program.

GENERAL COMMENTS

DEQ understands from reviewing the document that over a 3-day period, three surface water samples (i.e., shallow depth, mid-depth, near bottom) will be collected at each sampling location during ebb, flood, and slack tides. It appears from Table 1 that during the sampling program NWNG's goal is to collect one sample at each location during each tidal event. The Surface Water FSP does not include information about how sampling will proceed in the field so that comparable representative samples are collected within the timeframes indicated (i.e., three hours prior to low and high tides, or one hour before or after low and high tide).

DEQ considers the overall data collection objective of the surface water sampling program to be obtaining comparable data representative of the range of conditions operating in the river. To meet this objective DEQ expects the sampling approach to be modified so samples are collected at or near slack high tide and slack low tide, and during either the flood or ebb tides. Of the three tidal events identified for sampling in the Surface Water FSP, DEQ considers the slack tide sampling to be of particular interest as it represents tidal extremes. The lowest and highest potential groundwater flux into the river presumably occurs at high and low slack tides respectively. Furthermore, given the approximate symmetry of the tidal cycle, DEQ considers samples collected during the ebb and flood tides to be duplicative. As such, DEQ considers focusing sampling efforts on the slack tides (i.e., collecting samples during both slack tides) to be warranted.

SPECIFIC COMMENTS

Section 1.1. The Surface Water FSP concludes that, "Due to iron levels in the groundwater, a large portion of measured total cyanide is complexed with iron in a stable iron cyanide form". DEQ consider it premature to draw conclusions regarding the stability and forms of cyanide in groundwater, TZW, or surface water without completing the Offshore FSA and Surface Water FSP.

In the last paragraph, NWNG indicates that existing information will be reviewed to evaluate the potential for migration of free cyanide in groundwater to surface water. In addition to the data generated by the Offshore FSA and Surface Water FSP, uplands groundwater information should be included in the data review and analysis. Additionally, the text indicates that data from this work will be used to assess the potential unacceptable risk of exposure to receptors in the river from cyanide. DEQ understands this to mean that the surface water data will support the in-water ecologic risk assessment to be prepared by the LWG.

Section 2. DEQ understands from Table 1 that during each of the three tidal events measurements of field water quality parameters (2nd bulleted item) will be made, and three water column samples (3rd bulleted item) will be collected at each sampling location. This information should be clearly stated in the referenced bulleted items.

The 6th and 7th bulleted items indicate that relative to the NWNG property lines, two downstream (GSW-01, GSW-02) and two upstream (GSW-19, GSW-20) sampling locations have been included in the sampling program. According to the text of the bullets, downstream locations GSW-01 and GSW-02 are intended to “determine dilution of potential sources from the site”, and upstream sites GSW-19 and GSW-20 are going to be used to “evaluate background levels”. The footnote associated with these two bulleted items indicates that “downstream” and “upstream” relative to the NWNG Property depend on the direction of the river current at the time of sampling (e.g., GSW-19 and GSW-20 are “downstream” when the current is to the south). The text and footnote are confusing and appear to be contradictory. NWNG should clarify the specific data collection objectives of these four sampling locations.

Section 2.1. The text of the Surface Water FSP indicates that sampling stations will be located along transects A and B, while Figure 2 shows that sampling will occur along transects B and C. The document should be reviewed and revised as appropriate.

Section 2.1.3. It is unclear to DEQ as to how surface water data will be used to develop exposure concentrations for “infaunal” ecological receptors. In general, DEQ considers it more appropriate to use sediment and TZW data to assess the potential risk of exposure to infaunal organisms by MGP-related contamination. The risk of exposure to epifaunal organisms should utilize sediment, TZW, and “near-bottom” surface water data. In any case, prior to developing exposure concentrations DEQ expects NWNG to provide the proposed approach for our review and approval.

Section 2.2. DEQ’s comments to the second and third bulleted items in Section 2 apply here.

Section 3.4. DEQ recommends that symbols representing flood (F), ebb (E), slack high (S_h), and slack low (S_l) tides be incorporated into the sample identifiers. DEQ considers this nomenclature to be more informative than the symbols proposed (i.e., “H” and “L” for samples collected at near high or near low tides respectively). The nomenclature is also consistent with the surface water sampling scope of work

Section 3.5.1. For clarification and completeness, the first paragraph should indicate that the general protocol for collecting “unfiltered” surface water samples is provided in this section and that Section 3.5.2 describes procedures for collecting “filtered” samples. DEQ also recommends that surface water samples be collected from shallowest to deepest to minimize the potential for cross-contamination.

DEQ requests that NWNG confirm our understanding of the following items discussed in the last paragraph of the section.

- The van Dorn sampler is of a horizontal type;
- The configuration of the surface water sampling equipment includes from lowermost to uppermost, 1) a 10-pound weight, 2) the camera, and 3) the 3-liter van Dorn sampler;
- The distance from the bottom of the 10-pound weight to the van Dorn sampler is approximately 2-feet; and
- NWNG considers the 10-pound weight to be sufficient for minimize drifting of the sampling equipment with the current at each of three proposed sampling depths.

A figure illustrating the sampling equipment set-up would be useful for communicating the information items listed above.

Additionally, NWNG indicates that samples exhibiting “excessive turbidity” will be discarded and the sampler will be redeployed. Samples exhibiting “excessive turbidity” are most likely to be those collected “near bottom”. The goal of the field program is to collect water column samples that are representative of natural conditions. DEQ expects water turbidity will be measured to establish ambient conditions prior to collecting the “near bottom” samples. This data will be compared to sample turbidity to determine whether the sample is representative and should be retained for analysis. Similarly, DEQ understands “non-turbid” to mean that a sample has measurable turbidity comparable to natural conditions.

Section 3.5.2. The filtered sample collection procedure calls for flushing the peristaltic pump tubing with a “small amount” of sample water prior to collecting the sample. The procedure should also include running sample water through the filter until discharge is observed at the outlet and before the sample is collected.

Section 3.5.3. DEQ does not approve the procedures for measuring water quality parameters and current velocity described in this section of the Surface Water FSP. The text does not adequately discuss how the depth of parameter/velocity measurements will be correlated to the sample collection depth. In addition, given that all surface water sample collection stations are located greater than 100 feet from the shoreline, NWNG’s proposal to only measure current velocity/direction at three sites between 50 and 100 feet from the shoreline is not sufficient to inform the sampling program.

DEQ recommends that methods for measuring water quality parameters and current velocity be modified so that measurements are made: 1) at depths approximately equal to the depth of surface water sample collection; and 2) concurrently at every surface water sampling station. These data collection objectives could be achieved by attaching the multiprobe and velocity meter to a calibrated telescoping rod or 10-pound weighted line.

Section 3.6.1. NWNG indicates that replicate samples will require the van Dorn sampler to be deployed twice. DEQ understands that the field replicates are intended to provide duplicate unfiltered and filtered sample sets from selected sampling locations. If this is the case then the

van Dorn sampler will be deployed 4 times for the replicate (twice for unfiltered plus twice for filtered). Alternatively, NWNG may be referring to the number of sampler deployments to collect two complete sets filtered and unfiltered samples. The text should be reviewed and revised as appropriate to clarify NWNG's intentions.

Section 3.6.4. NWNG indicates that field activities will be documented in a field logbook. Section 3.5.3 further indicates that field measurements will be recorded on a field measurement log sheet. Neither the list of logbook entries nor the log sheet includes all of the information typically needed to document sample collection (e.g., sample collection time, sampling method, number of containers, container type/size, use and type of preservative). The section should be revised accordingly.

Section 3.6.5. DEQ recommends that field equipment calibration checks be performed at least twice per day according to manufacturer's specifications (e.g., once prior to initiating sampling and once at the end of the day). Calibrating the meters twice is needed to assess probe sensor drift that can occur over time, particularly with pH and dissolved oxygen sensors. DEQ further recommends that field equipment calibration measurements be recorded in log books dedicated to each instrument.

Section 3.7.1. DEQ recommends the following regarding field equipment decontamination:

- The van Dorn sampler should be washed with phosphate-free detergent and tap water, and rinsed with deionized water prior to each sampling event and between each sampling station.
- In addition to using a new filter to collect samples for dissolved analyte analysis, DEQ recommends using dedicated peristaltic pump tubing at each sampling station.

Section 4. Given the information provided, it is unclear how the sulfide data will be used in interpreting sampling results and evaluating risk. NWNG indicates that complexes of iron, sulfide, and cyanide result in less toxic forms of cyanide. DEQ anticipates that additional supporting information will be provided in the report documenting the results of the surface water sampling work.

Table 2. DEQ understands that: 1) the second column provides the minimum sample size needed to complete the specified analysis; and 3) the third column indicates the volume of sample that will be collected during the field program. NWNG should confirm this is the case and revise the column headings accordingly.

Table 3. The method detection limit (MDL) and the practical quantitation limit (PQL) listed for total, amenable, and free cyanide is 0.005 milligrams per liter (mg/l) is 0.010 mg/l. NWNG indicates that these may be the lowest values achievable for these parameters. For NWNG's information, DEQ is aware of a laboratory achieving a "method reporting limit" for free cyanide of 0.003 mg/l. DEQ will expect that to the maximum extent practicable, the PQL and MDL for free cyanide will be the lowest value achievable with the goal being less than 0.005 mg/l.

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Figure 2. For comparison purposes and completeness, the Offshore FSA Step 1 sampling locations should be labeled for reference.

NEXT STEPS

Before initiating surface water sampling field work DEQ expects NWNG to provide a revised version of the Surface Water FSP for DEQ's review. The revised document should fully address DEQ's comments provided above.

DEQ acknowledges and appreciates NWNG's expansion of the work in the Willamette River to include surface water sampling for cyanide. Please contact me with questions regarding this letter.

Sincerely,

Dana Bayuk
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